

Preliminary Amendment

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Timothy L. HOOPMAN et al.

Serial No.: 09/520,032

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For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

wherein at least one of the angles of the first plurality is different from all of the angles of the second plurality of angles.

Sub B1
23. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, and wherein at least one of the second plurality is different from all of the angles of the first and third plurality of angles.

24. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, and wherein at least one of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles.

Sub D3
25. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at

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~~least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.~~

Sub 3
26. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.

R'
27. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.

Sub 4
28. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, and further wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair.

29. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least two adjacent cavities have at least one dimension different between the two cavities.

30. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first shape and a second group of cavities has a second, different, shape.

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31. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first size and a second group of cavities has a second, different, size.
32. (NEW) A production tool suitable for use in manufacturing an abrasive article comprising a plurality of cavities defined by substantially distinct and discernible boundaries which include substantially specific dimensions, wherein a first cavity has specific first dimensions and a second cavity has specific second dimensions, and further wherein each of said cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first cavity is different from all the angles of intersection of said second cavity.
- ~~33. (NEW) The production tool of claim 22 which is a coating roll.~~
34. (NEW) The production tool of claim 23 which is a coating roll.
35. (NEW) The production tool of claim 24 which is a coating roll.
36. (NEW) The production tool of claim 25 which is a coating roll.
37. (NEW) The production tool of claim 26 which is a coating roll.
38. (NEW) The production tool of claim 27 which is a coating roll.
39. (NEW) The production tool of claim 28 which is a coating roll.
- ~~40. (NEW) The production tool of claim 29 which is a coating roll.~~

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- Sub
C4
41. (NEW) The production tool of claim 30 which is a coating roll.
42. (NEW) The production tool of claim 31 which is a coating roll.
43. (NEW) The production tool of claim 32 which is a coating roll.
44. (NEW) The production tool of claim 22 which is an engraved metal roll.
45. (NEW) The production tool of claim 23 which is an engraved metal roll.
46. (NEW) The production tool of claim 24 which is an engraved metal roll.
47. (NEW) The production tool of claim 25 which is an engraved metal roll.
48. (NEW) The production tool of claim 26 which is an engraved metal roll.
49. (NEW) The production tool of claim 27 which is an engraved metal roll.
50. (NEW) The production tool of claim 28 which is an engraved metal roll.
51. (NEW) The production tool of claim 29 which is an engraved metal roll.
52. (NEW) The production tool of claim 30 which is an engraved metal roll.
53. (NEW) The production tool of claim 31 which is an engraved metal roll.

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Sub 4/

~~54. (NEW) The production tool of claim 32 which is an engraved metal roll.~~

55. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first and second plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape and the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second plurality of angles; and

forming the production tool using the design.

Sub 2/

~~56. (NEW) A method of making a production tool, the method comprising:~~

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, and third plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape, the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, and the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second and third plurality of angles, and wherein at least one of the second plurality is different from all of the angles of the first and third plurality of angles; and

forming the production tool using the design.

57. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a first, second, third, and fourth plurality of cavities, wherein the first plurality of cavities each have a first geometric shape and first plurality of angles forming the geometric shape,

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Sub B

~~the second plurality of cavities each have a second geometric shape and second plurality of angles forming the geometric shape, the third plurality of cavities each have a third geometric shape and third plurality of angles forming the geometric shape, and the fourth plurality of cavities each have a fourth geometric shape and fourth plurality of angles forming the geometric shape, wherein at least one of the angles of the first plurality is different from all of the angles of the second, third, and fourth plurality of angles, wherein at least one of the second plurality is different from all of the angles of the first, third, and fourth plurality of angles, and wherein at least one of the third plurality is different from all of the angles of the first, second, and fourth plurality of angles; and forming the production tool using the design.~~

A

58. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

59. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, wherein at least 30% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

60. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity,

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wherein at least 50% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

61. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have a geometric shape, dimensions defining the cavity, and angles forming the geometric shape, wherein the angles are different in at least two of the cavities, and further wherein at least 10% of pairs of adjacent cavities have at least one dimension different between the two cavities of the pair; and

forming the production tool using the design.

62. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities, wherein the cavities each have dimensions defining the cavity, and wherein at least two adjacent cavities have at least one dimension different between the two cavities; and

forming the production tool using the design.

63. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first shape and a second group of cavities has a second, different, shape; and

forming the production tool using the design.

64. (NEW) A method of making a production tool, the method comprising:

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creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defining at least a first and a second group, wherein a first group of cavities has a first size and a second group of cavities has a second, different, size; and forming the production tool using the design.

65. (NEW) A method of making a production tool, the method comprising:

creating a design for a production tool for manufacturing an abrasive article, the production tool comprising a plurality of cavities defined by substantially distinct and discernible boundaries which include substantially specific dimensions, wherein a first cavity has specific first dimensions and a second cavity has specific second dimensions, and further wherein each of said cavities has a boundary defined by at least four planar surfaces wherein adjacent planar surfaces of one cavity meet at an edge to define an angle of intersection therebetween, wherein at least one angle of intersection of said first cavity is different from all the angles of intersection of said second cavity; and forming the production tool using the design.

66. (NEW) The method of claim 55, wherein the production tool is a coating roll.

67. (NEW) The method of claim 56, wherein the production tool is a coating roll.

68. (NEW) The method of claim 57, wherein the production tool is a coating roll.

69. (NEW) The method of claim 58, wherein the production tool is a coating roll.

70. (NEW) The method of claim 59, wherein the production tool is a coating roll.

71. (NEW) The method of claim 60, wherein the production tool is a coating roll.

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72. (NEW) The method of claim 61, wherein the production tool is a coating roll.
73. (NEW) The method of claim 62, wherein the production tool is a coating roll.
74. (NEW) The method of claim 63, wherein the production tool is a coating roll.
75. (NEW) The method of claim 64, wherein the production tool is a coating roll.
76. (NEW) The method of claim 65, wherein the production tool is a coating roll.
77. (NEW) The method of claim 55, wherein the production tool is an engraving roll.
78. (NEW) The method of claim 56, wherein the production tool is an engraving roll.
79. (NEW) The method of claim 57, wherein the production tool is an engraving roll.
80. (NEW) The method of claim 58, wherein the production tool is an engraving roll.
81. (NEW) The method of claim 59, wherein the production tool is an engraving roll.
82. (NEW) The method of claim 60, wherein the production tool is an engraving roll.
83. (NEW) The method of claim 61, wherein the production tool is an engraving roll.
84. (NEW) The method of claim 62, wherein the production tool is an engraving roll.
85. (NEW) The method of claim 63, wherein the production tool is an engraving roll.

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86. (NEW) The method of claim 64, wherein the production tool is an engraving roll.

87. (NEW) The method of claim 65, wherein the production tool is an engraving roll.
